

**Cathodic Protection Current Measurement
(CPCM™)**

ILI Tool

Research / Development Update

CPCM™ is a Joint Development project of:

- Baker Hughes PMG
- Shell Oil Company
- US DOT (PHMSA)



Pipeline Management Group



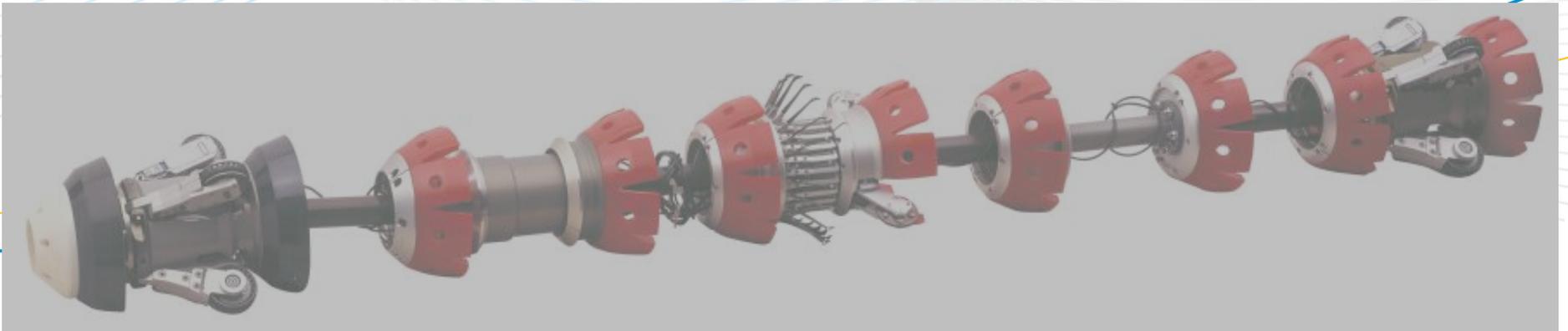
Pipeline and Hazardous
Materials Safety Administration

History of CPCM Technology Development efforts

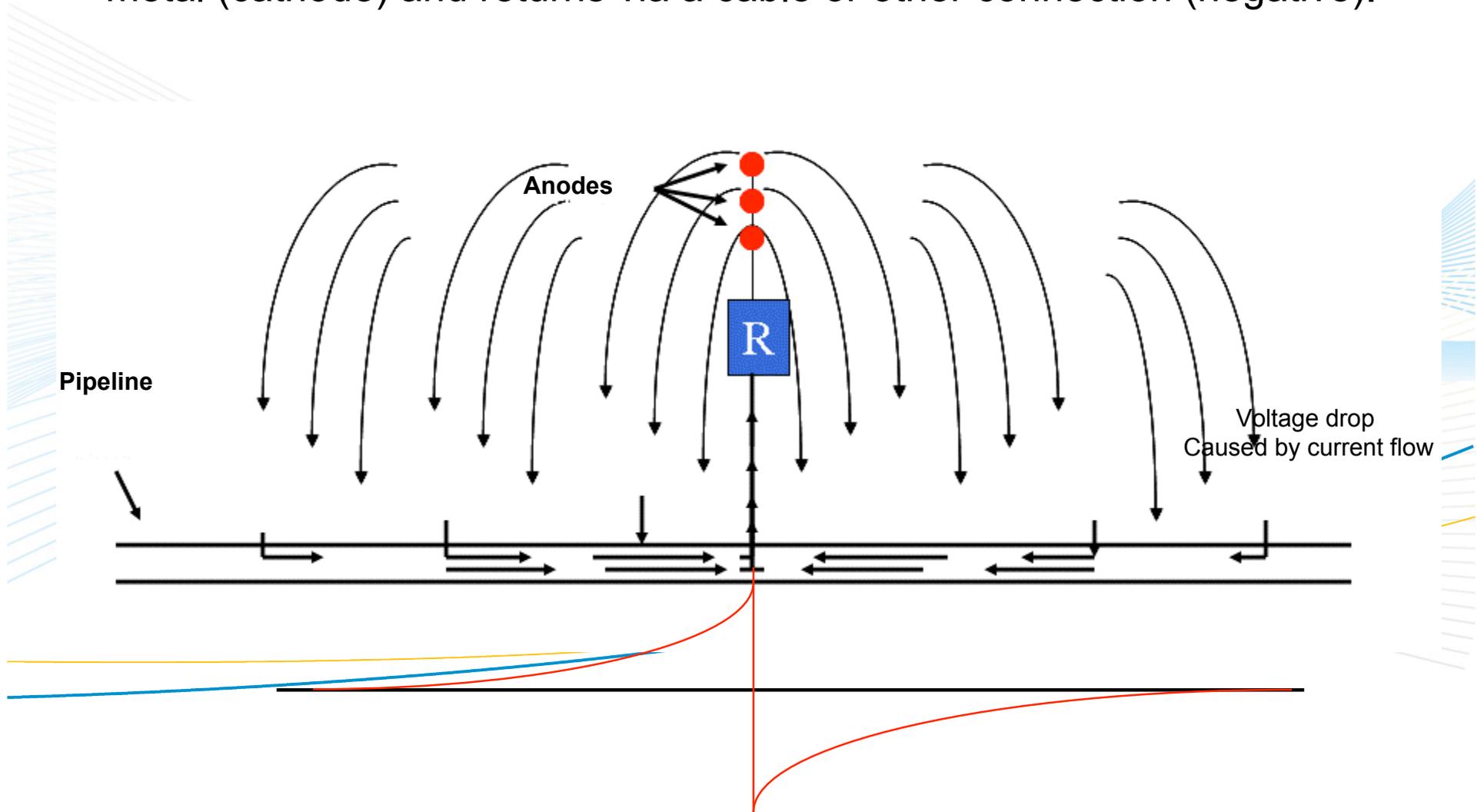
- \$450K funding by Shell Pipeline Company (SPLC) 2002-2005 resulted in confirmation of technology
- Corporate funding ceased
- Awarded \$400K by the US Department of Transportation to continue the work (May 2005).
- SPLC entered into a joint development / license agreement with Baker Hughes Pipeline Management Group to develop a working 12-inch prototype pig and evaluate viability of commercialization (June 2005)
- Patent awarded in September 2006
- 2006 to present - commercial development of technology by Baker. Tool has been successfully run on 450 pipeline miles for various major pipeline operators

What is CPCM?

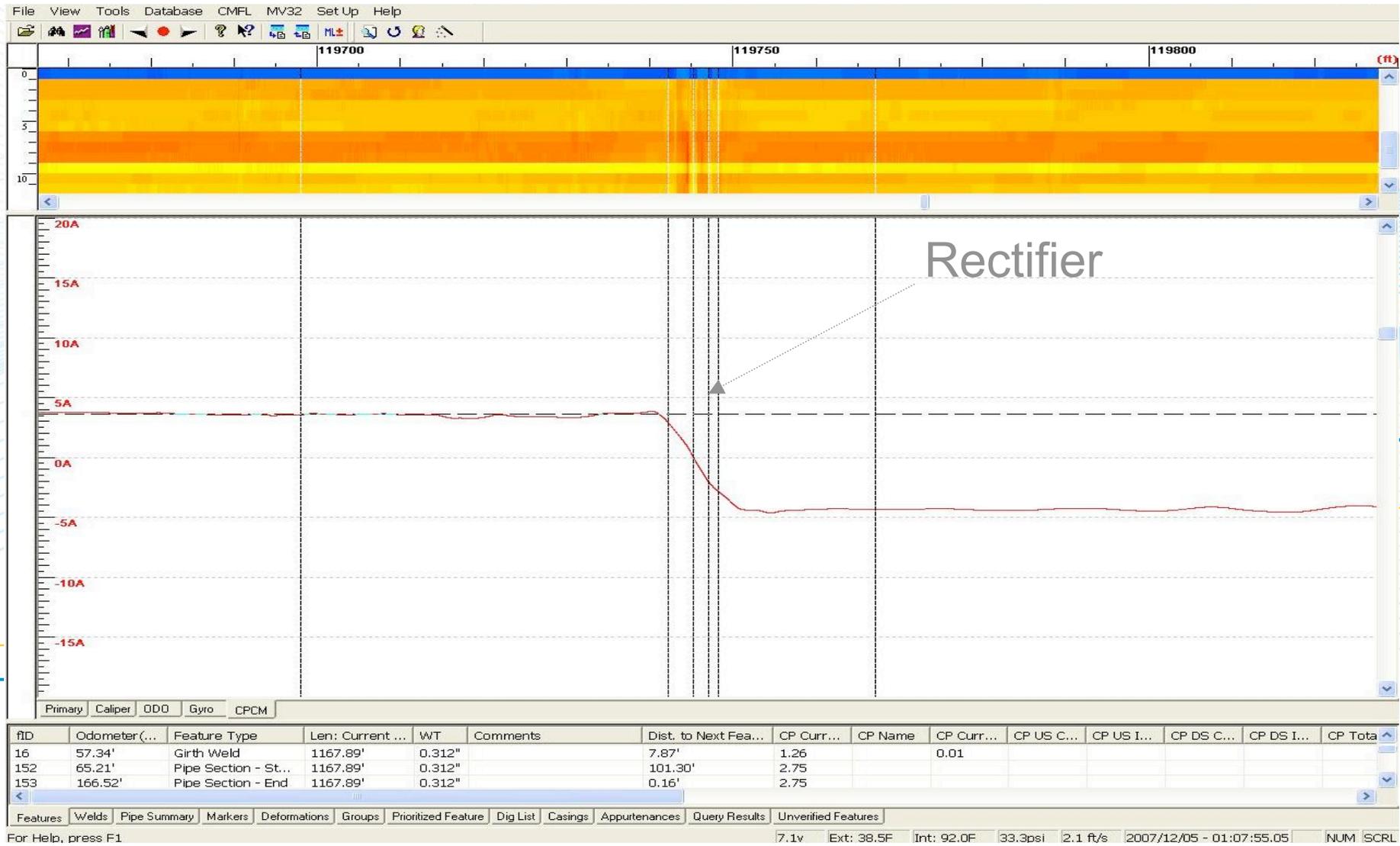
- ILI tool that measures CP current flow in a pipeline by recording the voltage drop across a length of pipe (~ 2-3 m)
- Changes in current density are readily identified and these signatures enable analysis of CP current flow
- Onboard Inertial Mapping Unit and Caliper



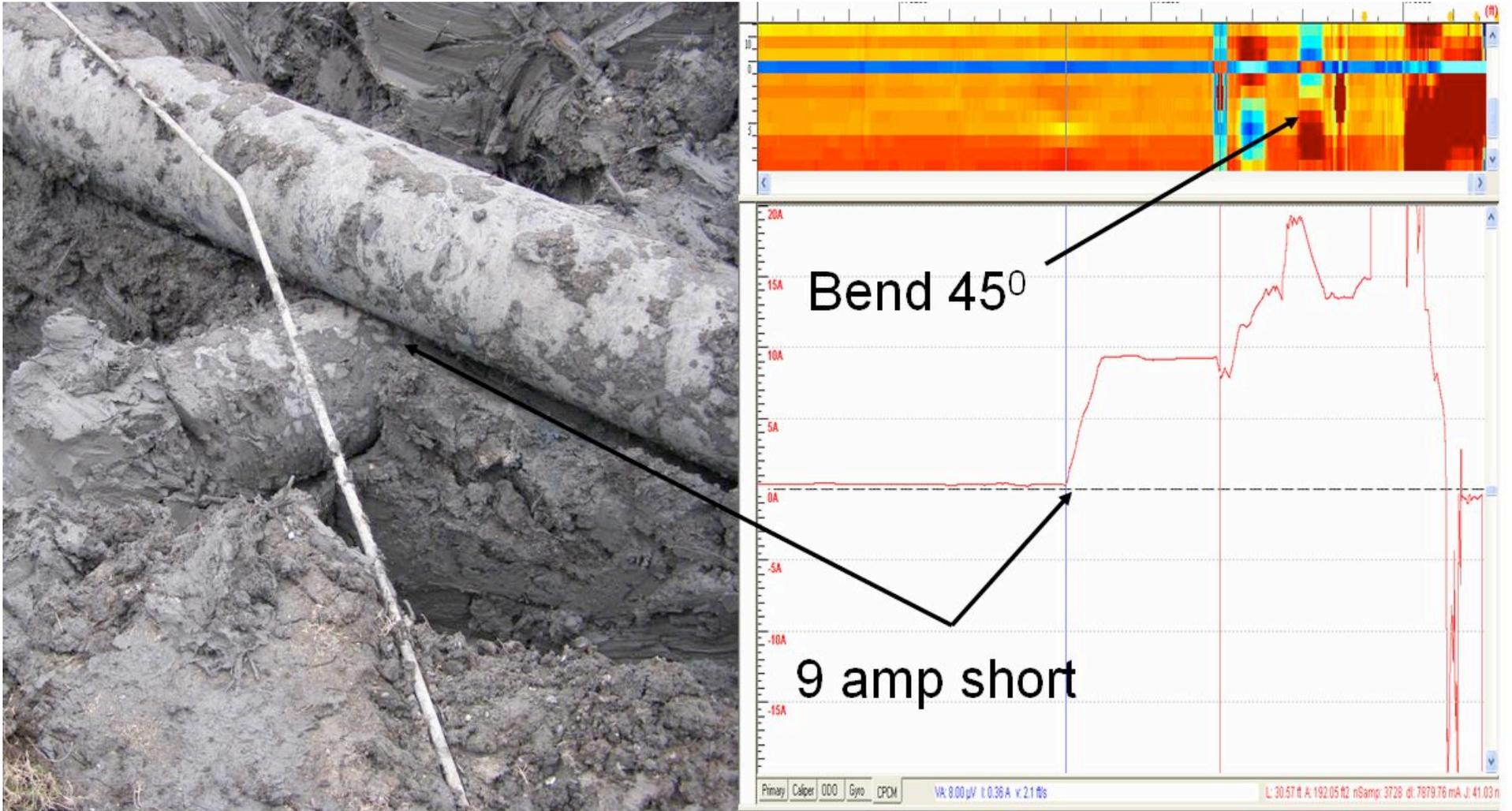
CP current is being “pushed” by the rectifier to the anodes where it enters the soil (electrolyte) then travels to the pipe surface where it enters the metal (cathode) and returns via a cable or other connection (negative).



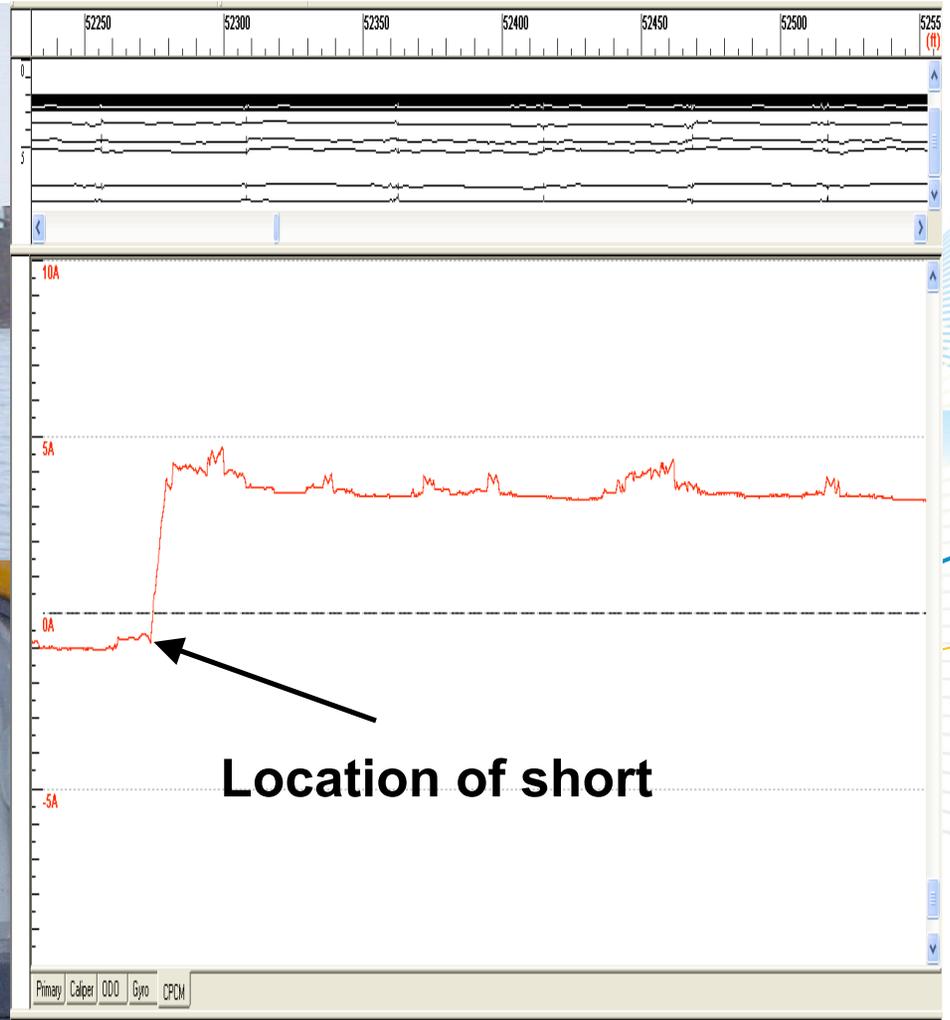
Sample CP Signatures - Rectifier



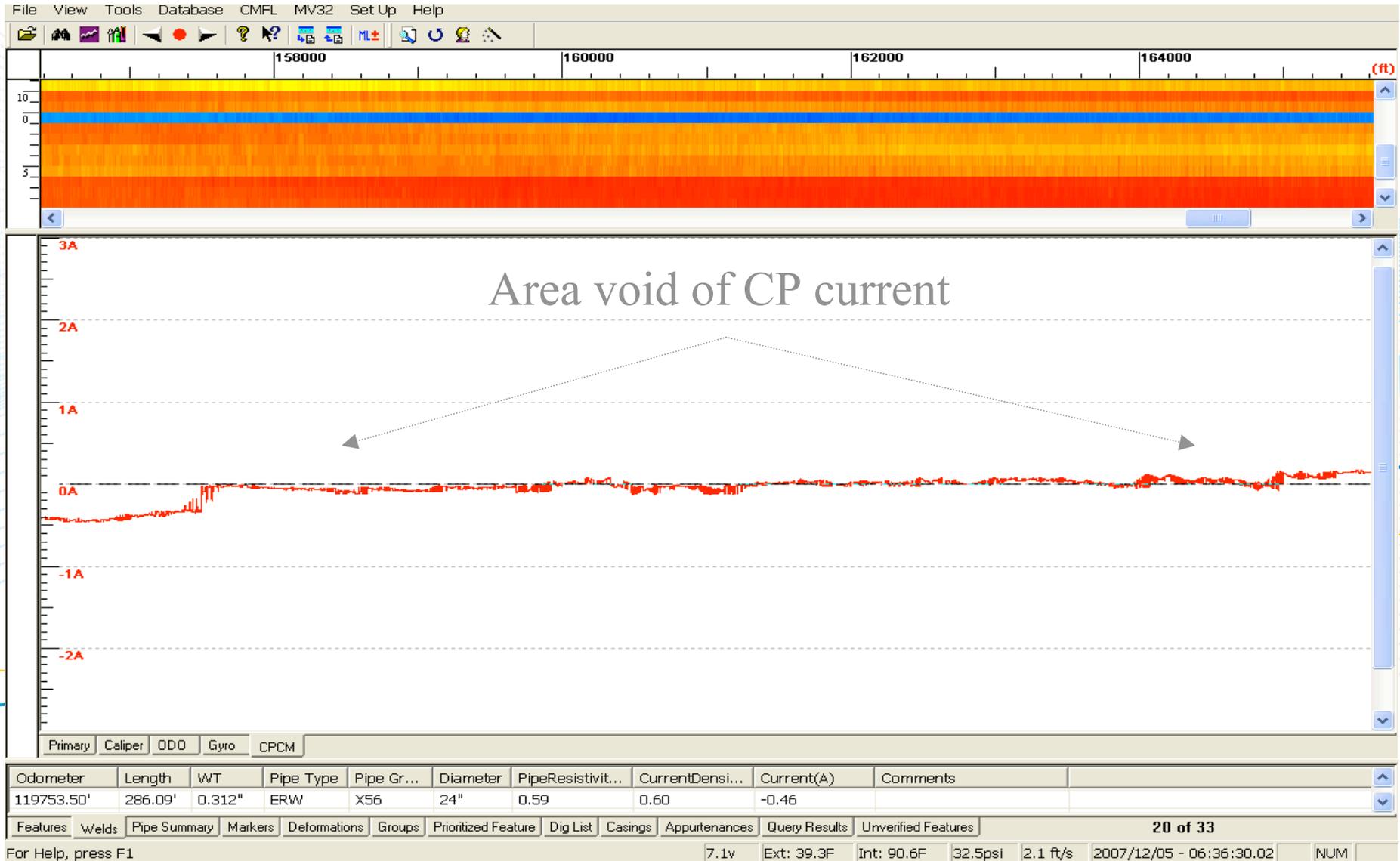
Sample CP Signatures - Short



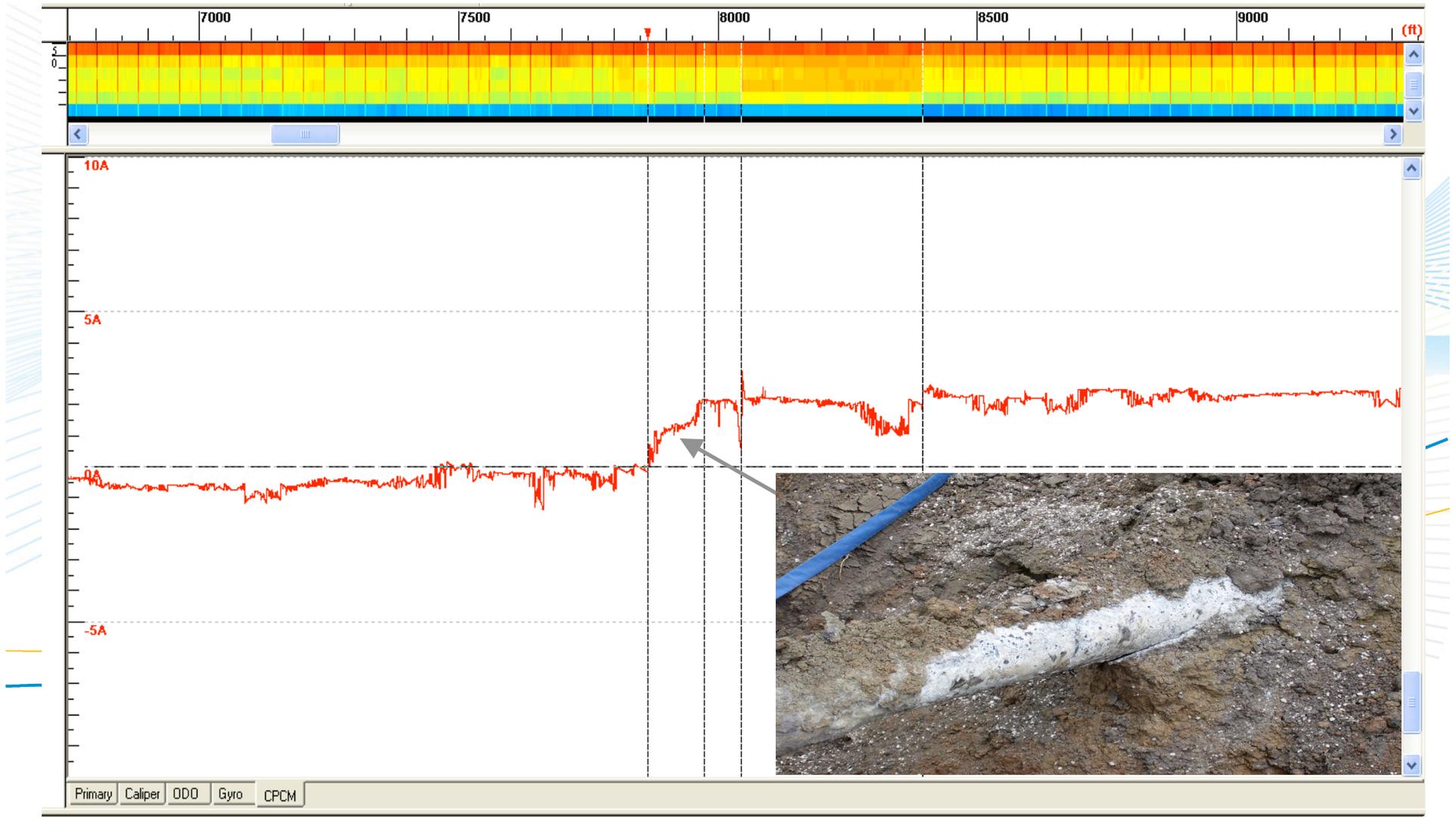
Sample CP Signatures - Short



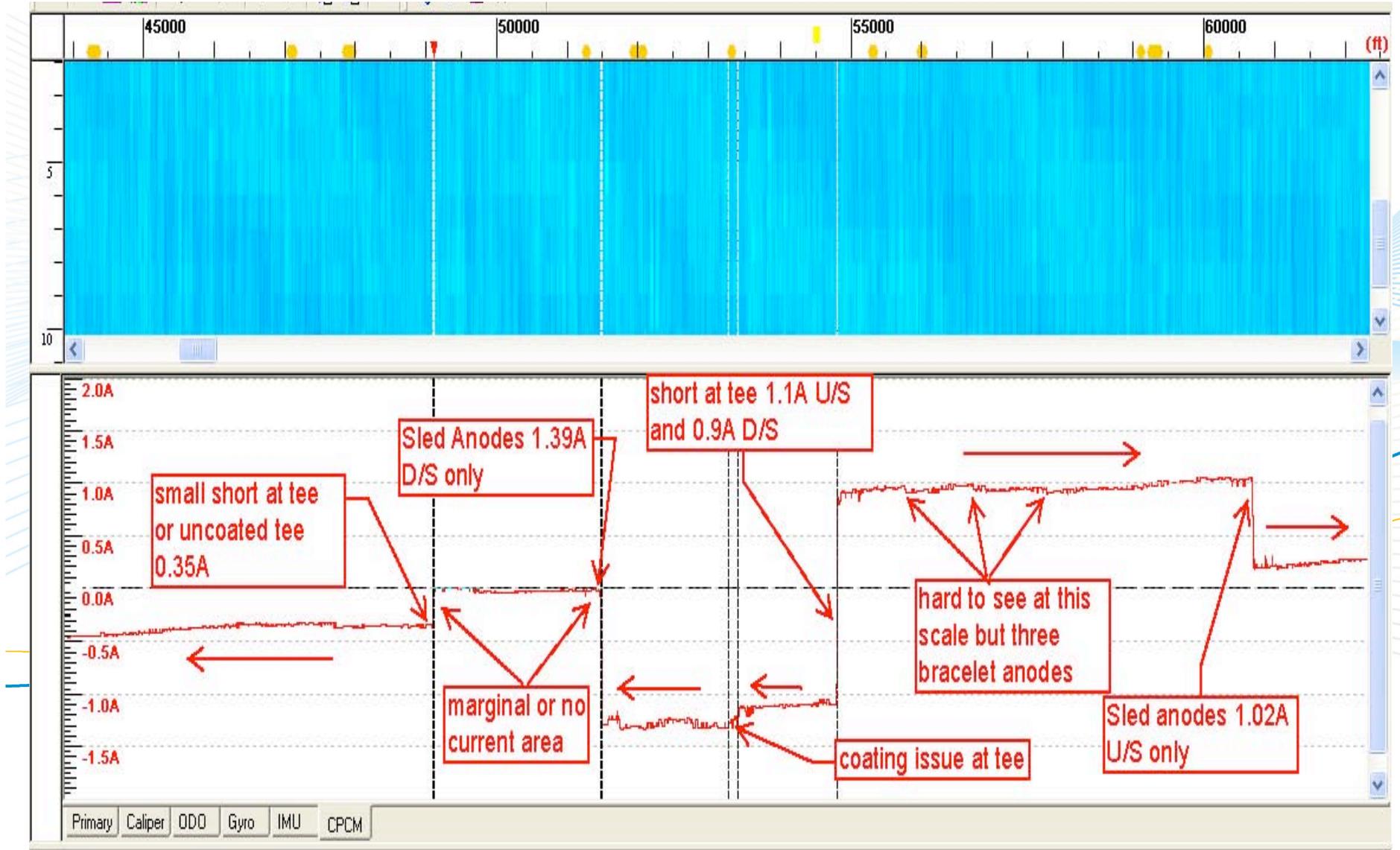
Sample CP Signatures – Void of CP

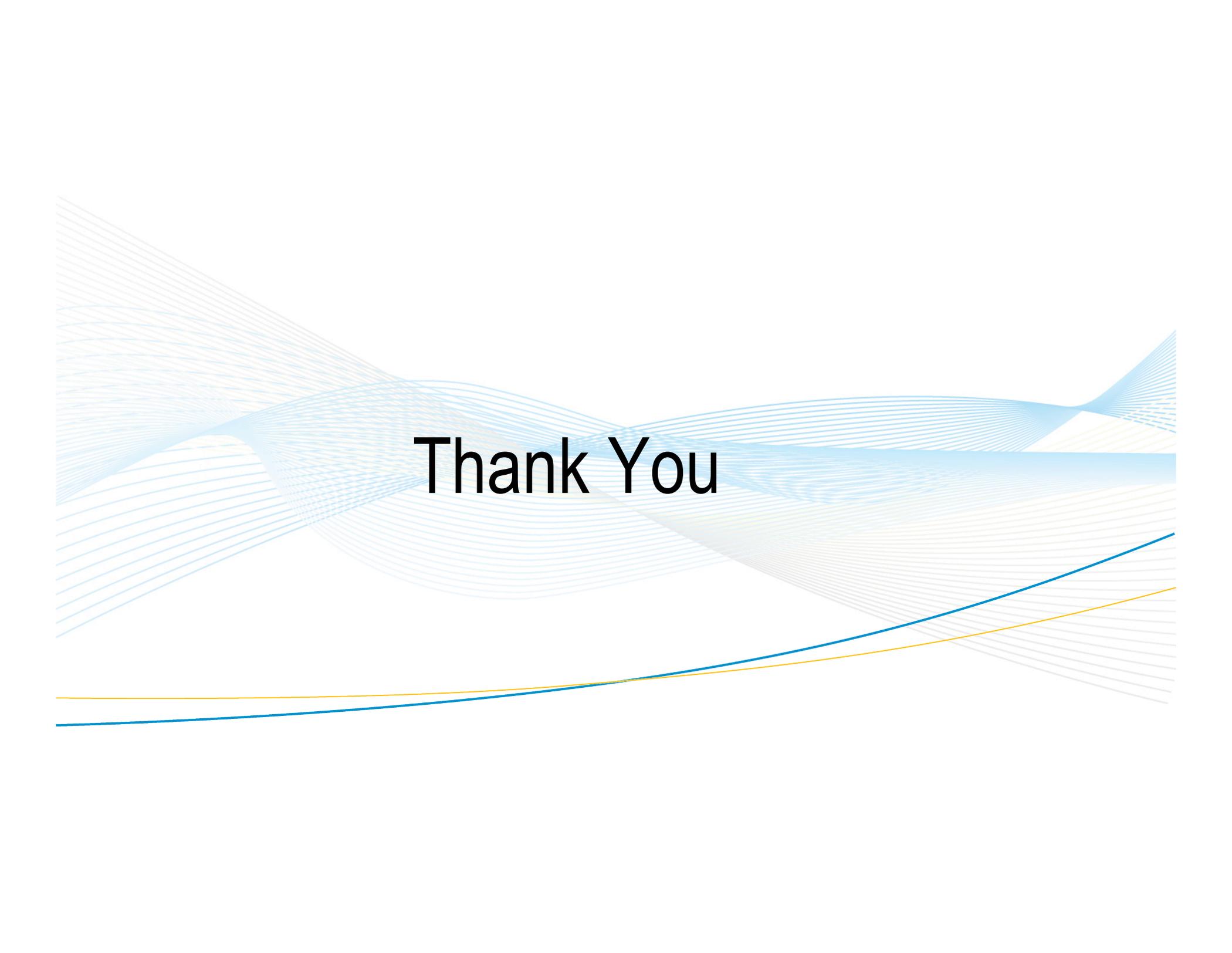


Sample CP Signatures - Area of damaged coating



Sample CP Signatures - Offshore Pipeline with Sleds



The background features a complex, abstract design. It consists of numerous thin, overlapping lines in shades of light blue and pale yellow, creating a sense of depth and movement. These lines form a series of overlapping, wavy bands that sweep across the frame. In the lower portion of the image, there are two distinct, solid-colored lines: a blue line and a yellow line, both curving upwards from left to right. The overall aesthetic is clean, modern, and professional.

Thank You